

WHAT IS CLAIMED IS:

1. A control device for controlling a cluster operation of a plurality of devices, comprising:

a restoring portion for restoring a device in an energy saving state to a stand-by state, if the number of devices in the stand-by state is smaller than a required number of devices for the cluster operation; and

a distribution portion for distributing a job to each device, if a sum of the number of devices in the stand-by state and the number of devices restored to the stand-by state by said restoring portion reaches said required number.

15 2. The control device according to claim 1, wherein said restoring portion sets up a device restored from the energy saving state to the stand-by state in accordance with the specified restoring conditions.

20 3. The control device according to claim 2, wherein said restoring conditions include a warm-up time for the device to return to the stand-by state, and/or the last operation time and/or the functions provided for the device.

25

4. A control device for controlling a cluster operation of a plurality of devices, comprising:

5

a selecting portion for selecting an insufficient number of devices from among the devices in an energy saving state, if the number of devices in a stand-by state is less than a required number of devices for the cluster operation; and

a distribution portion for distributing a job to each device already in the stand-by state and each device in the energy saving state that is selected by said selecting portion.

10

5. The control device according to claim 4, wherein said distribution portion distributes the job so that a less amount of job to each device in the energy saving state that is selected by said selecting portion is allocated than the amount of job to each device already in the stand-by state.

20

6. The control device according to claim 4, wherein said distribution portion distributes the job to said each device on the basis of the time for which the device in the energy saving state that is selected by said selecting portion gets to the stand-by state.

25

7. A network system having connected the control device according to claim 1 and a multi-function device for performing the cluster operation under the control of said control device.

8. A control method for controlling a cluster operation of a plurality of devices, comprising:

5 a restoring step of restoring a device in an energy saving state to a stand-by state, if the number of devices in the stand-by state is smaller than a required number of devices for the cluster operation; and

10 a distribution step of distributing a job to each device, if the sum of the number of devices in the stand-by state and the number of devices restored to the stand-by state at said restoring step reaches said required number.

15 9. The control method according to claim 8, wherein said restoring step sets up a device restored from the energy saving state to the stand-by state in accordance with the specified restoring conditions.

20 10. The control method according to claim 9, wherein said restoring conditions include a warm-up time for the device to return to the stand-by state, and/or a last operation time and/or a functions provided for the device.

25

11. A control method for controlling a cluster operation of a plurality of devices, comprising:

a selecting step of selecting an insufficient number of devices from among the devices in an energy saving state, if the number of devices in a stand-by state is less than a required number of devices for the  
5 cluster operation; and

a distribution step of distributing a job to each device already in the stand-by state and each device in the energy saving state that is selected at said selecting step.

10

12. The control method according to claim 11, wherein said distribution step distributes the job so that a less amount of job to each device in the energy saving state that is selected at said selecting step is  
15 allocated than the amount of job to each device already in the stand-by state.

13. The control method according to claim 11, wherein said distribution step distributes the job to said each  
20 device on the basis of the time for which the device in the energy saving state that is selected at said selecting step gets to the stand-by state.

14. A computer program for controlling the cluster  
25 operation of a plurality of devices, which runs on a computer, comprising:

a restoring step code for restoring a device in

an energy saving state to a stand-by state, if the number of devices in the stand-by state is less than a required number of devices for the cluster operation; and

5        a distribution step code for distributing a job to each device, if the sum of the number of devices in the stand-by state and the number of devices restored to the stand-by state at said restoring step reaches said required number.

10

15. The computer program according to claim 14, wherein said restoring step sets up a device restored from the energy saving state to the stand-by state in accordance with the specified restoring conditions.

15

16. The computer program according to claim 14, wherein said restoring conditions include a warm-up time for the device to return to the stand-by state, and/or the last operation time and/or the functions  
20 provided for the device.

17. A computer program for controlling the cluster operation of a plurality of devices, which runs on a computer, comprising:

25        a selecting step code for selecting an insufficient number of devices from among the devices in an energy saving state, if the number of devices in

a stand-by state is less than a required number of devices for the cluster operation; and

a distribution step code for distributing a job to each device already in the stand-by state and each 5 device in the energy saving state that is selected at said selecting step.

18. The computer program according to claim 17, wherein said distribution step distributes the job so

10 that the allocation of job to each device in the energy saving state that is selected at said selecting step is less frequent than the allocation of job to each device already in the stand-by state.

15 19. The computer program according to claim 18, wherein said distribution step distributes the job to said each device on the basis of the time for which the device in the energy saving state that is selected at said selecting step gets to the stand-by state.

20

20. A computer readable storage medium for storing the computer program according to claim 14.

21. A network device in which a cluster operation can 25 be realized in cooperation of a plurality of network devices, comprising:

a determination portion for determining whether

or not the cluster operation is running if the conditions for transferring to an energy saving state are met; and

5 a state transfer portion for transferring to the energy saving state in accordance with an instruction from an external device, irrespective of said conditions, if it is determined that the cluster operation is running.

10 22. A control method for a network device in which the cluster operation can be realized in cooperation of a plurality of network devices, comprising:

a determination step of determining whether or not the cluster operation is running if the conditions

15 for transferring to an energy saving state are met; and

a state transfer step of transferring to the energy saving state in accordance with an instruction from an external device, irrespective of said conditions, if it is determined that the cluster

20 operation is running.

23. A computer program for controlling a network device in which the cluster operation can be realized in cooperation of a plurality of network devices,

25 comprising:

a determination step code for determining whether or not the cluster operation is running if the

conditions for transferring to an energy saving state are met; and

a state transfer step code for transferring to the energy saving state in accordance with an instruction from an external device, irrespective of said conditions, if it is determined that the cluster operation is running.

24. A computer readable storage medium for storing  
10 the computer program according to claim 23.

25. A control device for controlling the cluster operation with the network device according to claim 21, comprising:

15 a determination portion for determining whether or not the conditions for transferring the network device in the cluster operation to an energy saving state are met; and

a state transfer portion for transferring said network device to an energy saving mode by determining said network device to be transferred to the energy saving state if said conditions are met.

26. The control device according to claim 25, wherein  
25 the conditions determined by said determination portion include the elapse time from the stop of the cluster operation exceeding a predetermined time, and said

state transfer portion transfers preferentially a device with longer stand-by time to the energy saving state.

5 27. The control device according to claim 25, wherein  
the conditions determined by said determination portion  
include the elapse time from the stop of the cluster  
operation exceeding a predetermined time, and said  
state transfer portion transfers preferentially a  
10 device with shorter lifetime to the energy saving state.

28. The control device according to claim 25, wherein  
the conditions determined by said determination portion  
include the elapse time from the stop of the cluster  
operation exceeding a predetermined time, and said  
state transfer portion transfers preferentially a  
device with shorter transfer time to the stand-by state.  
15

20 29. A control method for controlling the cluster  
operation with the network device according to claim 21,  
said control method comprising:

a determination step of determining whether or not the conditions for transferring the network device in the cluster operation to an energy saving state are met; and

a state transfer step of transferring said

network device to the energy saving mode by determining said network device to be transferred to the energy saving state if said conditions are met.

5    30. The control device according to claim 25, wherein  
the conditions determined at said determination step  
include the elapse time from the stop of the cluster  
operation exceeding a predetermined time, and said  
state transfer step comprises transferring  
10 preferentially a device with longer stand-by time to  
the energy saving state.

31. The control device according to claim 25, wherein  
the conditions determined at said determination step  
15 include the elapse time from the stop of the cluster  
operation exceeding a predetermined time, and said  
state transfer step comprises transferring  
preferentially a device with shorter lifetime to the  
energy saving state.

20  
32. The control device according to claim 25, wherein  
the conditions determined at said determination step  
include the elapse time from the stop of the cluster  
operation exceeding a predetermined time, and said  
25 state transfer step comprises transferring  
preferentially a device with shorter transfer time to  
the stand-by state to the energy saving state.

33. A computer program for controlling the cluster operation with the network device according to claim 21, comprising:

5           a determination step code for determining whether or not the conditions for transferring the network device in the cluster operation to an energy saving state are met; and

10          a state transfer step code for transferring said network device to an energy saving mode by determining said network device to be transferred to the energy saving state if said conditions are met.

34. The computer program according to claim 33,  
15 wherein the conditions determined at said determination step include the elapse time from the stop of the cluster operation exceeding a predetermined time, and said state transfer step comprises transferring preferentially a device with longer stand-by time to  
20 the energy saving state.

35. The computer program according to claim 33,  
wherein the conditions determined at said determination step include the elapse time from the stop of the  
25 cluster operation exceeding a predetermined time, and said state transfer step comprises transferring preferentially a device with shorter lifetime to the

energy saving state.

36. The computer program according to claim 33,  
wherein the conditions determined at said determination  
5 step include the elapse time from the stop of the  
cluster operation exceeding a predetermined time, and  
said state transfer step comprises transferring  
preferentially a device with shorter transfer time to  
the stand-by state to the energy saving state.

10

37. A computer readable storage medium for storing a  
computer program according to claim 33.

38. A computer readable storage medium for storing  
15 the computer program according to claim 17.